COMPREHENSIVE REPORT OF ONLINE WORKSHOP ON

Emerging Techniques in Agriculture and Allied Sciences: Use of Artificial Intelligence and Sensor Based Technologies

22 February to 26 February 2021

Follow Up Workshop: 5 April 2021

Organised by

Faculty of Agriculture Science and Technology, Mansarovar Global University, Bhopal

With support from

Commonwealth Educational Media Centre for Asia,

New Delhi

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Introduction:

Agriculture is transforming at a rapid pace across the world. It is expected that due to global climate change and allied anthropogenic factors the effects will be felt more in the developing countries. This is besides the shrinkage of agricultural lands, depletion of natural resources and soil salinization. In a condition when the arable land is fast shrinking and with escalation in global population it is expected that by 2050 there will be a need to produce 70% more food than the existing amount of food grains.

Moreover, it has been recorded that due to poor information there are times when the amount of agriculture inputs is either more or less than those of the required limit. This imbalance leads to poor productivity at all the stages and in many cases the runoff causes environmental pollution as well. It has also been reported that the poor record keeping also leads to information gap about the true genetic potential of the native genetic resources.

This necessitates the usage of emerging technologies viz. artificial intelligence, data mining, machine learning, deep learning, so that natural resources are used appropriately. The usage of these technologies helps in monitoring the physiological needs of the crops over the growth and pre harvest period. The knowledge of post-harvest physiology of the crop is expected to minimize the losses during that period. Therefore, use of such techniques can optimize the production of crops and livestock and thereby plug the sources of leak in the production system.

However, as these technologies are of quite recent origin, there is a need to disseminate information on the different aspects of sensor-based techniques and artificial intelligence and their usage in agriculture and allied sciences. Hence, this workshop was organised by the Faculty of Agriculture Science and Technology, Mansarovar Global University, with support from the Commonwealth Educational Media Centre for Asia, New Delhi.

Focus of the Workshop

The workshop was intended to share the information on emerging techniques in agriculture with the students and researchers so that the same can trickle down to the various stakeholders. The information regarding these technologies needs to be shared in an easily understandable language. Sensors are now being included in precision agriculture and the present five-day workshop was held keeping into account the various aspects of agriculture and allied sciences.

Programme Poster

Participants: The programme was attended by 80 participants including students (post graduate and undergraduate), instructors of various teaching institutions (lecturers, Assistant Professors), and researchers (PhD students, research scholars). Participants belonged to diverse disciplines, for example, food technology, livestock sciences, agriculture and allied sciences, basic sciences (botany, zoology, chemistry), and food sciences.

The participants were spread across different institutions across India and the world. Some of the institutions include Mansarovar Global University, G.B. Pant University of Agriculture and Technology, University of Kashmir, Sardar Vallabh Bhai Patel University of Agriculture and Technology, different government and private educational institutions, and Indian Council for Agriculture Research institutions. Participants were also present from Hawassa University and Arsi University in Ethiopia.

The list of participants is included in the Appendix.

Methodology: The live sessions of the online workshop were conducted over five days from 22 February 2021 till 26 February 2021. The workshop timing was between 2PM and 4PM so that it could be attended by students and the experts. Asynchronous interaction and communication was facilitated through a WhatsApp group created for the programme.

The training methodology was a combination of presentation by experts and activities for participants. Assignments were given to participants to assimilate and apply what they have learnt.

A follow-up workshop was conducted after a month of the initial training. An interactive session was facilitated to provide feedback on assignments, clarification of doubts and a platform for sharing of experiences and learning.

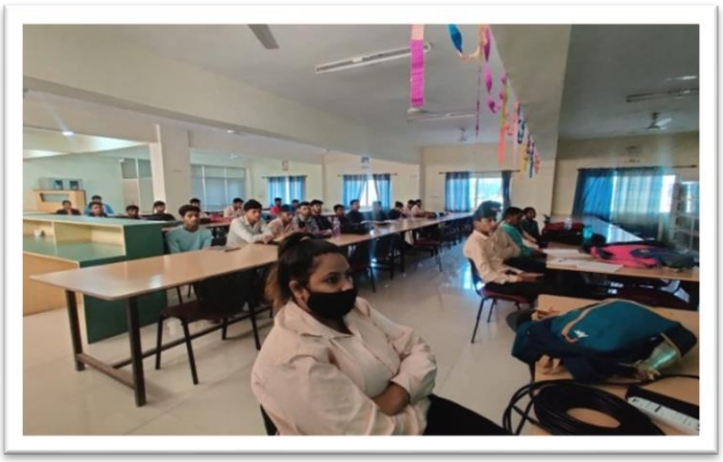
Day One: 22 February 2021

The workshop was inaugurated with an introductory note by Dr. Shiffon Chatterjee, Senior Programme Officer (Online and Blended Learning), CEMCA. The inaugural session was graced by the presence of Prof. Madhu Parhar, Director Commonwealth Educational Media Centre for Asia and Prof. Arun K. Pandey, Vice Chancellor, Mansarovar Global University. Prof. Parhar and Prof. Pandey in their address the audience emphasised the importance of agriculture and allied sciences to the national gross domestic product; its role in earning of foreign currency; and how sensors and artificial intelligence can assist in improving the overall productivity of the agrarian economy.

The inaugural address was followed by the technical session conducted by Prof. Sandip Banerjee. The session topic was: **Sensors in livestock farming with special emphasis to poultry and small ruminants.** The presentation introduced the participants to the basics of spectroscopy and the principles behind it. The presentation included the information related to the factors associated with low production of chickens and small ruminants (sheep and goats). The different sensors used in environmental controlling of poultry houses were discussed. The presentation included the importance of Internet of things and the theory behind it. The presentation also included the types of wearable sensors used in small ruminant husbandry.

The students from Mansarovar Global University attended as a group and they attended it by viewing the presentation through a projection on a screen. The presentation was followed by assignments on the topic which was then shared with the participants through a WhatsApp group. Participants were expected to present their assignments in the follow-up session.

The assignment was provided in both English and Hindi language so that it could be understood by a larger section of the participants. The assignments were so prepared that the students can have a larger understanding of the topic.



Participants from Mansarovar Global University attending in a group

Day 1: Assignment on Poultry and Small ruminants

Assignments for participants for the Workshop

Sensors in livestock farming with special emphasis to poultry and small ruminants

Q1. Why sensors are used in intensive poultry operations? What are the commonly used sensors in commercial poultry farms?

Q1। सघन कुक्कुट पालन में सेंसर का उपयोग क्यों किया जाता है? वाणिज्यिक पोल्ट्री फार्मों में आमतौर पर उपयोग किए जाने वाले सेंसर क्या हैं?

Q2. How are the sensors used in sheep and goat farms different than those of the dairy farms? What are the major gaps that have remained unfulfilled with the present day sensors and how do you plan to bridge the same.

Q2। भेड़ और बकरी में इस्तेमाल होने वाले सेंसर डेयरी फार्मों की तुलना में अलग कैसे हैं? वर्तमान समय के सेंसर के साथ जो प्रमुख अंतराल बने हुए हैं और आप उसी को कैसे पाट सकते हैं।

Q3.How are the sensors used in layer poultry farms different than those of the broiler poultry farms? Besides what types of sensors do you expect to be included in the incubators for better hatchability of eggs?

Q3। **लेयर** मुर्गियों पोल्ट्री फार्मों में उपयोग किए जाने वाले सेंसर ब्रायलर पोल्ट्री फार्मों की तुलना में किस प्रकार भिन्न होते हैं? अंडे की बेहतर हैचबिलिटी के लिए आप इन्क्यूबेटरों में किस प्रकार के सेंसर शामिल करने की उम्मीद करते हैं?

Q4. Can acoustics based sensors be used in modern day sheep and goat dairy farms if so what can be their major advantages over the prevailing management systems. How can acoustic data be assessed and interpreted for feeding and breeding management?

Q4। क्या आधुनिक दिन भेड़ और बकरी डेयरी फार्म में ध्वनिकी आधारित सेंसर का उपयोग किया जा सकता है यदि ऐसा है तो प्रचलित प्रबंधन प्रणालियों पर उनके प्रमुख लाभ क्या हो सकते हैं। खिलाने और प्रजनन प्रबंधन के लिए ध्वनिक डेटा का आकलन और व्याख्या कैसे की जा सकती है?

Q5.What are the major functions of "infra red thermography" when it comes to management of sheep reared in the hot and humid tropics? Why do you think that assessment of methane and ammonia is important in poultry production in the tropics?

Q5. जब यह गर्म और नम उष्णकटिबंधीय में पाला गया भेड़ के प्रबंधन की बात आती है, तो "इन्फ्रा रेड थर्मोग्राफी" के प्रमुख कार्य क्या हैं? आपको क्यों लगता है कि उष्णकटिबंधीय में पोल्ट्री उत्पादन में मीथेन और अमोनिया का मूल्यांकन महत्वपूर्ण है?

Q6.Discuss the principles behind the functioning of infra red spectrograph, what are the roles of the filters when it comes to assessment of feed quality parameters .

Q6। अवरक्त स्पेक्ट्रोग्राफ के कामकाज के पीछे के सिद्धांतों को ध्यान में रखें। फ़ीड गुणवत्ता मापदंडों के मूल्यांकन की बात आने पर फ़िल्टर की क्या भूमिकाएँ हैं?

Q7. Among the "four pillars of internet of things" which one do you think is the most weak in the developing countries and why? how can you plan to make it strong especially in the developing countries.

Q7. "वस्तु अंतरजाल" के चार स्तंभों" में से एक जो आपको लगता है कि विकासशील देशों में सबसे कमजोर है और क्यों? आप इसे विशेष रूप से विकासशील देशों में कैसे मजबूत बनाने की योजना बना सकते हैं।

Q8.It has been reported that 'human interference" is one of the factors associated with low productivity of chickens and sheep and goats. Justify the claim. How can sensors be helpful to minimize such interference

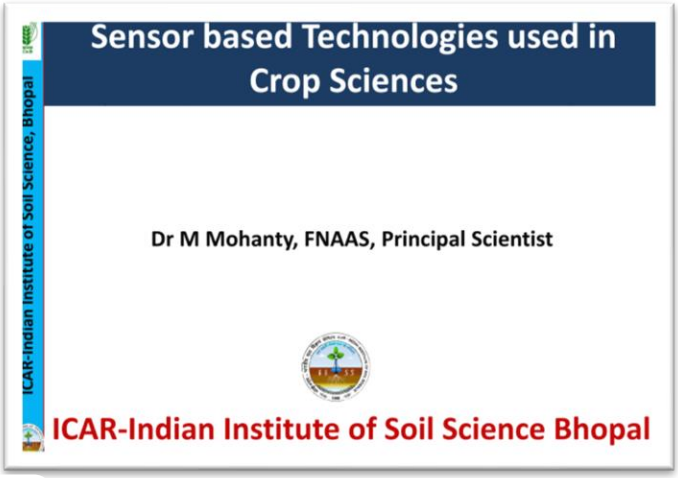
Q8. यह बताया गया है कि 'मानव हस्तक्षेप' मुर्गियों और भेड़ और बकरियों की कम उत्पादकता से जुड़े कारकों में से एक है। कृपया दावे का औचित्य साबित करें। ऐसे हस्तक्षेप को कम करने के लिए सेंसर कैसे सहायक हो सकते हैं

Q9. Besides the mentioned details regarding the usages of infra red thermal scanner, how do you think it can further be improved (and more parameters included) keeping into account their usages in the days to come?

Q9. इन्फ्रा रेड थर्मल स्कैनर के उपयोग के बारे में उल्लेखित विवरण के अलावा, आपको क्या लगता है कि आने वाले दिनों में उनके उपयोग को ध्यान में रखते हुए इसे और बेहतर बनाया जा सकता है (और अधिक पैरामीटर शामिल हैं)?

Day 2: 23 February 2021

The topic "**Sensor based technologies used in Crop Sciences**" was presented by Dr Monoranjan Mohanty, Principal Scientist, Indian Institute of Soil Sciences, ICAR. The topic pertained to the use of spectroscopy and allied technologies in improving the crop husbandry yield. The presentation included the understanding of the infra-red wavelength, its interpretation and how can it be correlated with the crop yield and diseases. The presentation also included the use of variable rate technology so that the optimisation of crop yield can be assessed. The use of sensor-based technologies in laboratory analysis of soil and crop quality too was presented. The assignments were bilingual and the participants were expected to provide a feedback on the assignment provided .



Participants attending the session by Dr. Monoranjan Mohanty

Day 2: Assignment on Sensor Based Technologies used in Crop Sciences

Sensor Based Technologies used in Crop Sciences

Assignments for the International Workshop

Assignments

1) Drones are becoming popular in many aspects of agricultural sciences what do you think will be the role of drones in 21st century agriculture/ horticulture especially in the scenario of the developing countries.

1) **कृषि विज्ञान के कई पहलुओं में ड्रोन लोकप्रिय हो रहे हैं, आपको क्या लगता है कि 21 वीं सदी के कृषि / बागवानी (विशेष रूप से विकासशील देशों के परिदृश्य में) ड्रोन की भूमिका क्या होगी।**

2) Global climate change is a reality, keeping into aspect the same how do you think can the sensor based techniques be helpful in assessment of nutrition status of the soil and the crops growing on it . What types of sensors do you think will be useful and why?

2) वैश्विक जलवायु परिवर्तन एक वास्तविकता है, इस पहलू को ध्यान में रखते हुए कि आपको कैसे लगता है कि सेंसर आधारित तकनीकें मिट्टी की पोषण स्थिति और उस पर उगने वाली फसलों के आकलन में सहायक हो सकती हैं। आपके विचार से किस प्रकार के सेंसर उपयोगी होंगे और क्यों?

3) Precision farming is considered as the "futuristic agriculture " or "agriculture of the 21st century", however in the developing countries most of the farmers belong to the landless, small and marginal categories, many of them lack proper training, knowledge about the sensors or allied technologies. Besides many of them lack the finances to purchase and implement these advanced techniques. How do you think that such farmers can benefit from such technologies?

3) परिशुद्ध खेती को "भविष्यवादी कृषि" या "21 वीं सदी की कृषि" के रूप में माना जाता है, हालांकि विकासशील देशों में अधिकांश किसान भूमिहीन, छोटे और सीमांत श्रेणी के हैं, उनमें से कई के पास उचित प्रशिक्षण, ज्ञान की कमी है। उनमें से कई के पास इन उन्नत तकनीकों को खरीदने और लागू करने के लिए वित्त की कमी है। आप कैसे सोचते हैं कि इस तरह की तकनीकों से ऐसे किसान लाभान्वित हो सकते हैं?

4) It has been reported that "**Soil nutrient sensors**" are eco friendly and the data obtained can be used to provide location specific solutions across the growing season of the crop, please justify the claim.

4) यह बताया गया है कि "**मृदा पोषक सेंसर**" पर्यावरण के अनुकूल हैं और प्राप्त आंकड़ों का उपयोग फसल के बढ़ते मौसम में स्थान विशिष्ट समाधान प्रदान करने के लिए किया जा सकता है, कृपया दावे का औचित्य साबित करें।

5) What do you understand by the term "**Climate smart agricultural practices**"? how do you think such practices can be helpful in achieving the goal of increase in food production especially when the amount of cultivable land and natural resources is shrinking and large acreage of land is becoming unfit for cultivation.

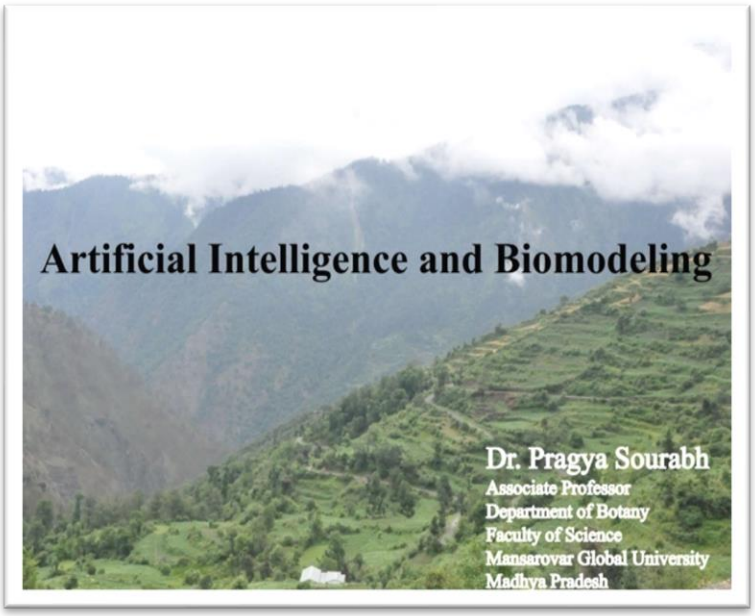
5) "जलवायु स्मार्ट कृषि प्रथाओं" शब्द से आप क्या समझते हैं? आपको क्या लगता है कि इस तरह की प्रथाएं खाद्य उत्पादन में वृद्धि के लक्ष्य को प्राप्त करने में सहायक हो सकती हैं, खासकर जब खेती योग्य भूमि और प्राकृतिक संसाधनों की मात्रा सिकुड़ रही है और बड़े पैमाने पर भूमि खेती के लिए अयोग्य हो रही है।

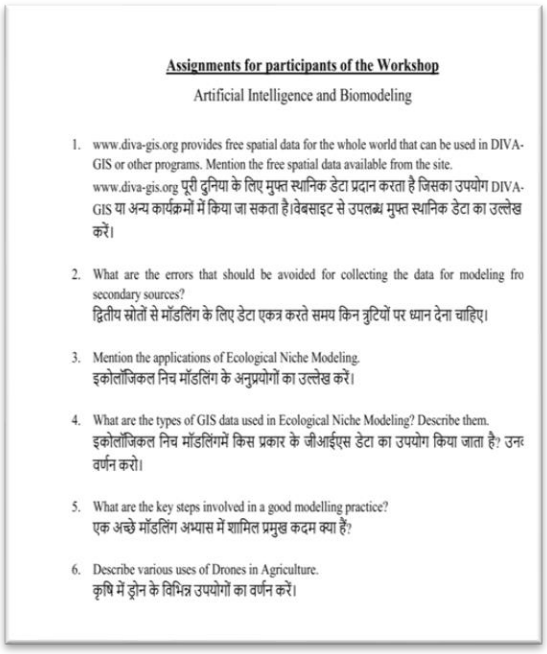
6) It has been reported that quality of water used for irrigation is also responsible for salinization of soil. Besides the same the utilizable lifespan of the equipments too are compromised through long term usages. How do you think that the "soil sensors" can be helpful in reducing the process of salinization? How do you think "soil sensors" can be helpful in assessment of "soil nutrient dynamics"?

6) यह बताया गया है कि सिंचाई के लिए उपयोग किए जाने वाले पानी की गुणवत्ता भी मिट्टी के लवण के लिए जिम्मेदार है। उसी के अलावा उपकरणों का उपयोग करने योग्य जीवनकाल भी दीर्घकालिक उपयोग के माध्यम से समझौता किया जाता है। आप कैसे सोचते हैं कि "मृदा सेंसर" लार बनाने की प्रक्रिया को कम

Day 3: 24 February 2021

The topic "**Artificial intelligence and bio modeling**" was presented by Dr. Pragya Sourabh. The use of artificial intelligence and bio modelling is now becoming an integral part of scientific research. Prediction of yield of different crops and the forest covers are now needed for assessing the impact of global climate change. It has been estimated that over the years there has been depletion in natural resources which can be due to anthropogenic and non anthropogenic causes. Bio models provide an early assessment based on the prevailing conditions of the area. These models can also help in understanding the possible impact over short and long term which is helpful in devising poly matter and the government can take appropriate measures prior to the actual occurring of the event. The session also included the possible use of different software and how the results are obtained and interpreted from the same. The participants from Mansarovar Global University were also apprised by Dr. Sourabh about the challenges related to the use of software.





Assignments for participants of the Workshop

Artificial Intelligence and Biomodeling

1. www.diva-gis.org provides free spatial data for the whole world that can be used in DIVA-GIS or other programs. Mention the free spatial data available from the site.
   www.diva-gis.org पूरी दुनिया के लिए मुफ्त स्थानिक डेटा प्रदान करता है जिसका उपयोग DIVA-GIS या अन्य कार्यक्रमों में किया जा सकता है।वेबसाइट से उपलब्ध मुफ्त स्थानिक डेटा का उल्लेख करें।
2. What are the errors that should be avoided for collecting the data for modeling fro secondary sources?
   द्वितीय स्रोतों से मॉडलिंग के लिए डेटा एकत्र करते समय किन त्रुटियों पर ध्यान देना चाहिए।
3. Mention the applications of Ecological Niche Modeling.
   इकोलॉजिकल निच मॉडलिंग के अनुप्रयोगों का उल्लेख करें।
4. What are the types of GIS data used in Ecological Niche Modeling? Describe them.
   इकोलॉजिकल निच मॉडलिंगमें किस प्रकार के जीआईएस डेटा का उपयोग किया जाता है? उनक वर्णन करो।
5. What are the key steps involved in a good modelling practice?
   एक अच्छे मॉडलिंग अभ्यास में शामिल प्रमुख कदम क्या हैं?
6. Describe various uses of Drones in Agriculture.
   कृषि में ड्रोन के विभिन्न उपयोगों का वर्णन करें।

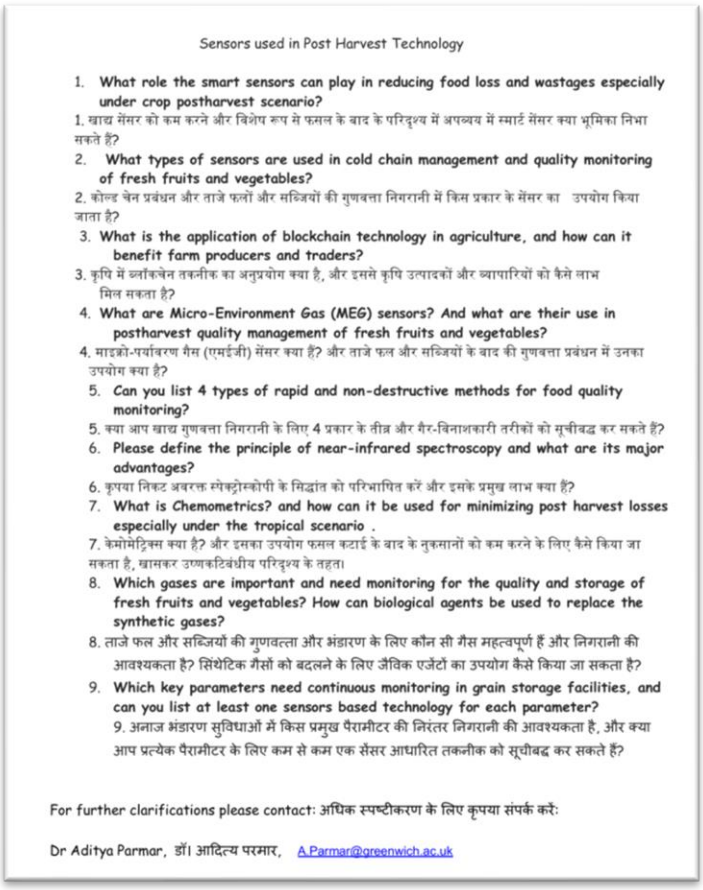
Day 3: Assignment on Artificial Intelligence and Biomodeling

Dr. Pragya Sourabh discussing with the participants regarding the different software used for biomodeling

Day 4: 25 February 2021

The session on "**Sensors and Digitalization – Emerging technologies for Post harvest quality management in Agri food chains**" was conducted by Dr. Aditya Parmar.

Post harvest technology plays an immense role in maintaining the quality of food products and improving their shelf life. It has been reported that the post harvest losses usually account for 20-60% losses which if minimized can improve the quality of life and provide adequate nutrition to the consumers. Use of artificial intelligence and allied technologies are now being used to understand the dynamics of the post harvest loss and also device methods to minimise the same. Sensors can provide real time data to access the process of deterioration of food and vegetables and can help in real time intervention. The role played by different classes of sensors and the correlation between the results obtained and the storage losses can be assessed. The use of internet of things (IOT) in post-harvest management was discussed. The participants were apprised about the different sensors used for grading; fruit/vegetable ripening, and modelling and colour changes. Prediction of ripening time and its relationship with environmental factors were discussed. The students were provided with assignments in both Hindi and English.



Sensors used in Post Harvest Technology

1. **What role the smart sensors can play in reducing food loss and wastages especially under crop postharvest scenario?**

1. खाद्य सेंसर को कम करने और विशेष रूप से फसल के बाद के परिदृश्य में अपव्यय में स्मार्ट सेंसर क्या भूमिका निभा सकते हैं?

2. **What types of sensors are used in cold chain management and quality monitoring of fresh fruits and vegetables?**

2. कोल्ड चेन प्रबंधन और ताजे फलों और सब्जियों की गुणवत्ता निगरानी में किस प्रकार के सेंसर का उपयोग किया जाता है?

3. **What is the application of blockchain technology in agriculture, and how can it benefit farm producers and traders?**

3. कृषि में ब्लॉकचेन तकनीक का अनुप्रयोग क्या है, और इससे कृषि उत्पादकों और व्यापारियों को कैसे लाभ मिल सकता है?

4. **What are Micro-Environment Gas (MEG) sensors? And what are their use in postharvest quality management of fresh fruits and vegetables?**

4. माइक्रो-पर्यावरण गैस (एमईजी) सेंसर क्या हैं? और ताजे फल और सब्जियों के बाद की गुणवत्ता प्रबंधन में उनका उपयोग क्या है?

5. **Can you list 4 types of rapid and non-destructive methods for food quality monitoring?**

5. क्या आप खाद्य गुणवत्ता निगरानी के लिए 4 प्रकार के तीव्र और गैर-विनाशकारी तरीकों को सूचीबद्ध कर सकते हैं?

6. **Please define the principle of near-infrared spectroscopy and what are its major advantages?**

6. कृपया निकट अवरक्त स्पेक्ट्रोस्कोपी के सिद्धांत को परिभाषित करें और इसके प्रमुख लाभ क्या हैं?

7. **What is Chemometrics? and how can it be used for minimizing post harvest losses especially under the tropical scenario .**

7. केमोमेट्रिक्स क्या है? और इसका उपयोग फसल कटाई के बाद के नुकसानों को कम करने के लिए कैसे किया जा सकता है, खासकर उष्णकटिबंधीय परिदृश्य के तहत।

8. **Which gases are important and need monitoring for the quality and storage of fresh fruits and vegetables? How can biological agents be used to replace the synthetic gases?**

8. ताजे फल और सब्जियों की गुणवत्ता और भंडारण के लिए कौन सी गैस महत्वपूर्ण हैं और निगरानी की आवश्यकता है? सिंथेटिक गैसों को बदलने के लिए जैविक एजेंटों का उपयोग कैसे किया जा सकता है?

9. **Which key parameters need continuous monitoring in grain storage facilities, and can you list at least one sensors based technology for each parameter?**

9. अनाज भंडारण सुविधाओं में किस प्रमुख पैरामीटर की निरंतर निगरानी की आवश्यकता है, और क्या आप प्रत्येक पैरामीटर के लिए कम से कम एक सेंसर आधारित तकनीक को सूचीबद्ध कर सकते हैं?

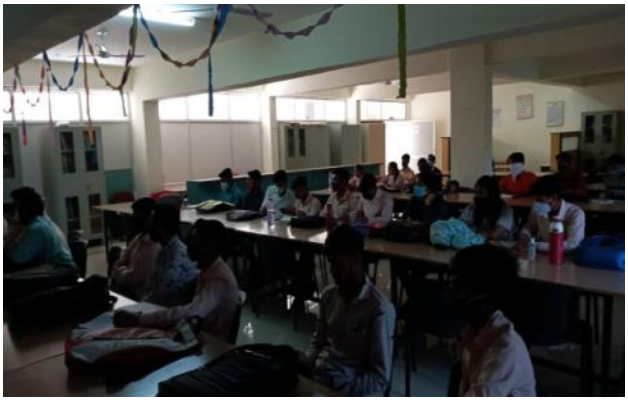
For further clarifications please contact: अधिक स्पष्टीकरण के लिए कृपया संपर्क करें:

Dr Aditya Parmar, डॉ। आदित्य परमार, A.Parmar@greenwich.ac.uk

Day 4: Assignment on Sensors used in Post-Harvest Technology

Day 5: 26 February 2021

The technical session on **Sensor based technologies used in dairy farming and technology** by Dr Mestawet Taye was presented by Prof. Sandip Banerjee on behalf of the former. Dairy farming is an important component of animal husbandry and it directly and indirectly employs a large section of the society. Milk is considered as a wholesome food, however it is prone to both insitu and exsitu contamination. Cattle if raised comfortably can yield higher amount of milk, remain healthy for longer period of time and will bear more numbers of calves in her lifetime. One of the reasons for low producing ability of the crossbred cattle can be ascribed to lack of understanding of the needs of the cows. Several studies have indicated that the



Students attending the session on Sensor based technologies used in dairy farming and technology

management of the zebu cattle and those of the taurine crossbreds are quite different. Under such condition use of sensors and internet of things can provide a guideline for management of cattle. Use of sensors for assessment of body temperature, pulse rate etc. can provide a guideline regarding the health of the cattle and also the ovulation status. Another group of sensors are related to identifying calving of the cows which can be helpful in minimizing the incidences of dystocia. The workshop also pertained to apprising the participants on the bio tongue, bio nose and automated microbe analysers. The types of sensors used in dairy processing were discussed.

Day 5: Assignment on Sensor based technologies used in dairy farming and technology

Assignments for participants for the Workshop

Sensor based technologies used in dairy farming and processing

Q1. Describe the principles of pressure "Sensors" how do they differ (in principle) from that of the temperature sensors.

Q1. दबाव "सेंसर" के सिद्धांतों का वर्णन करें कि वे तापमान सेंसर से कैसे भिन्न (सिद्धांत में) हैं।

Q2. How does thermal imagery can be used to detect diseases among dairy cows? Discuss with suitable examples

Q2. डेयरी गायों के बीच बीमारियों का पता लगाने के लिए थर्मल इमेजरी का उपयोग कैसे किया जा सकता है? उपयुक्त उदाहरणों के साथ चर्चा करें

Q3. It has been reported that all these sensors are operated using batteries which have a short lifespan, do you think the best options can be a bionic implant, if so how?

Q3. सभी सेंसर बैटरी के उपयोग से संचालित होते हैं जिनकी उम्र कम होती है, क्या आपको लगता है कि सबसे अच्छा विकल्प एक बायोनिक प्रत्यारोपण हो सकता है, यदि ऐसा है तो कैसे?

Q4.A dairy processing plant has requested you to provide them solution for microbial load in milk, however the sensors which are already in place are and when checked it was found that the sensors were working properly, suggest why the problem arose and how will you solve the problem.

Q4. एक डेयरी प्रसंस्करण संयंत्र ने आपको प्रसंस्करण इकाई में उच्च माइक्रोबियल भार के लिए समाधान प्रदान करने का अनुरोध किया है। माइक्रोबियल लोड के मूल्यांकन के लिए सेंसर जो पहले से ही प्रसंस्करण संयंत्र में स्थापित हैं, ठीक से काम कर रहे थे, कृपया सुझाव दें कि समस्या क्यों पैदा हुई और आप समस्या को कैसे हल करेंगे।

Q5. What are the different android based applications which are commonly available identify the ones which you think is appropriate for small holder dairy farmers in India and also those of your own country.

Q5. एंड्रॉइड आधारित विभिन्न एप्लिकेशन क्या हैं जो आमतौर पर उपलब्ध हैं जो आपको लगता है कि भारत और अन्य देशों में छोटे धारक डेयरी किसानों के लिए उपयुक्त हैं

Q6.There are several dairy products which are specialized for a particular countries/cities. Keeping into account how do you think the "**bio tongue** and **bio nose**" can be helpful in identification of the quality?

Q6. कई डेयरी उत्पाद हैं जो एक विशेष देशों / शहरों के लिए विशिष्ट हैं। आपको क्या लगता है कि "जैव जीभ और जैव नाक" गुणवत्ता की पहचान में सहायक हो सकते हैं?

Q7. You are expected to provide a radio talk on "smart dairy farming" narrate in detail which points would you consider in your talk and why?

Q7. आपसे "स्मार्ट डेयरी फार्मिंग" पर एक रेडियो वार्ता प्रदान करने की अपेक्षा की जाती है, जिसमें आप अपनी बात पर विचार करेंगे और क्यों?

Q8. It has been reported that maintenance of farm records is quite important, discuss the statement.

Q8. यह बताया गया है कि फार्म रिकॉर्ड का रखरखाव काफी महत्वपूर्ण है, बयान पर चर्चा करें।

Q9. Your friend has recently imported few cattle from abroad, these cattle have very good genetic makeup which is based on "**Genomic testing/Herd intelligence**" these cattle are being provided with recommended nutrition and management, yet their milk yield is much lower than what was expected, please discuss.

Q9. आपके मित्र ने हाल ही में विदेश से कुछ गायों का आयात किया है, इन गायों की बहुत अच्छी वंशावली है जो "जीनोमिक परीक्षण / झुंड बुद्धि" पर आधारित है। इन गायों को अनुशंसित पोषण और प्रबंधन प्रदान किया जा रहा है, फिर भी उनकी दूध की पैदावार उम्मीद से बहुत कम है। कृपया चर्चा करें।

Q10. In the 21st century dairy farming an dairy technology, how do you see will be the future without the use of modern day technologies, which technologies do you think will further revolutionize the dairy farming and technology in the decades ahead.

Q10. 21 वीं सदी में डेयरी फार्मिंग और डेयरी टेक्नोलॉजी, आप कैसे देखते हैं कि आधुनिक समय की तकनीकों के उपयोग के बिना भविष्य कैसा होगा, आपको लगता है कि आने वाले दशकों में डेयरी फार्मिंग और तकनीक में और क्या बदलाव आएंगे।

You may contact Prof Sandip Banerjee between 6:30 and 7:30 PM (Indian Standard Time) for any assistance on the above mentioned topic. Whatsaap: +919433743561 or sansoma2003@yahoo.co.in.

उपर्युक्त विषय पर किसी भी सहायता के लिए आप 6:30 से 7:30 बजे (भारतीय मानक समय) के बीच प्रोफेसर संदीप बनर्जी से संपर्क कर सकते हैं। व्हाट्सएप: +919433743561 या sansoma2003@yahoo.co.in

Follow-up programme: 5 April 2021

The follow-up of the five-day online workshop on Emerging techniques in Agriculture and Allied Sciences: Use of Artificial Intelligence and Sensor Based Technologies was organised on 5th April 2021, between 2PM and 4PM.

The assignments were prepared by the presenters and forwarded to the participants both through the WhatsApp group “MGU Agriculture" as well as through their respective email ID which was provided by the participants when they registered for the workshop.

The participants were informed to send their assignments on or before 1st April so that eight participants willing to present their assignments as PowerPoint presentations were identified. They were:

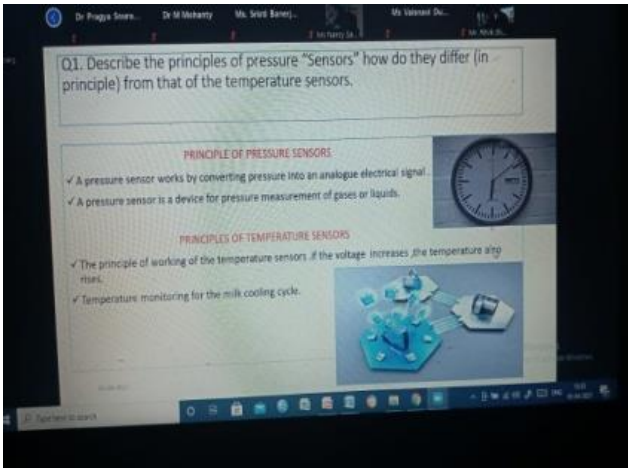
1. Ms Nancy Saha, BSc (Agriculture) Hons., Mansarovar Global University
2. Ms Sristi Banerjee, BSc (Agriculture) Hons., Mansarovar Global University
3. Ms Vaishnavi Dubey, BSc (Agriculture) Hons., Mansarovar Global University
4. Mr. Ritvik Sharma, BSc (Agriculture) Hons., Sardar Vallabh Bhai Patel University of Agriculture and Technology
5. Ms Shruti Raj, BSc (Agriculture) Hons., Mansarovar Global University
6. Ms Jaya Mandal, BSc (Agriculture) Hons., Mansarovar Global University
7. Mr. Ranjeet Patel, BSc (Agriculture) Hons., Mansarovar Global University
8. Mr. Mrityunjaya Sharma, BSc (Agriculture) Hons., Mansarovar Global University

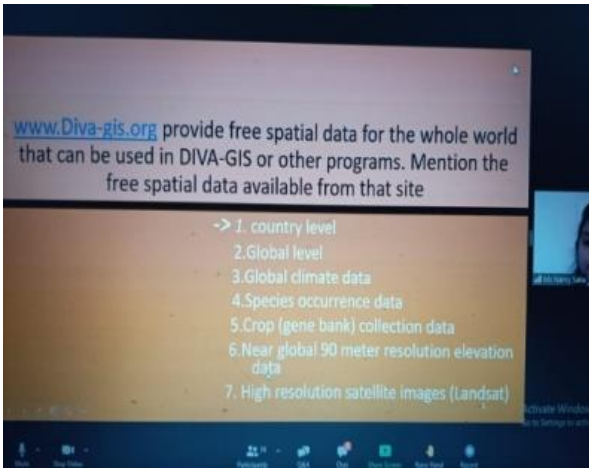
This part of the workshop was chaired by Prof Sandip Banerjee, who introduced the presenters to the expert panel. The presenters were told to present their responses to two questions from each of the five topics included in the workshop. Each presenter was given ten minutes to present their assignments and the last five minutes was for the mentors to provide their feedback on the assignments.

Dr Dhyan Singh interacting with the presenters

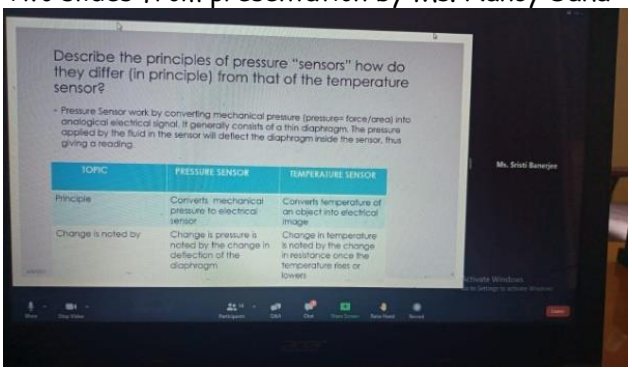
Besides the mentors, the presentations were assessed by Dr. Dhyan Singh, Principal Scientist (Retd.), who had been serving Indian Agriculture Research Institute (ICAR) in various capacities as an independent observer. Prof. Banerjee introduced Dr Dhyan Singh to Dr Shiffon Chatterjee from Commonwealth Media Centre for Asia, the panellists, and the presenters.

Presentations by participants

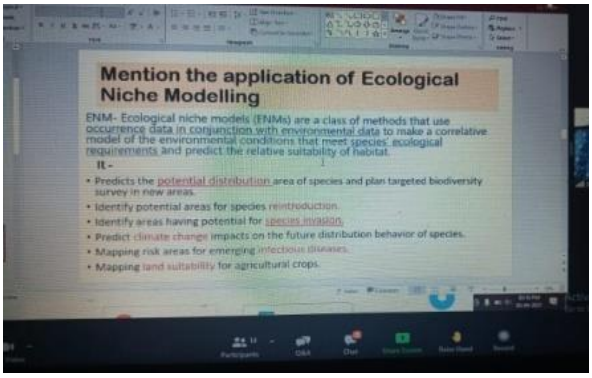




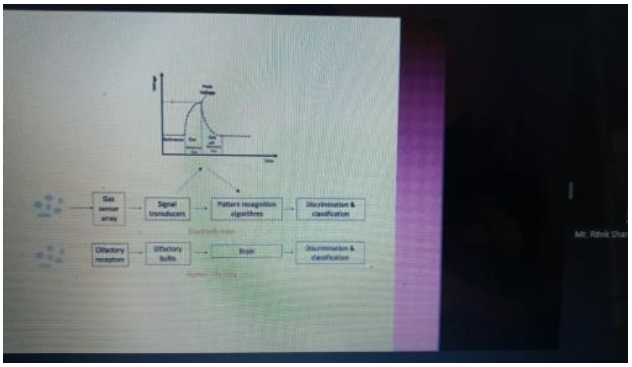
Two slides from presentation by Ms. Nancy Saha

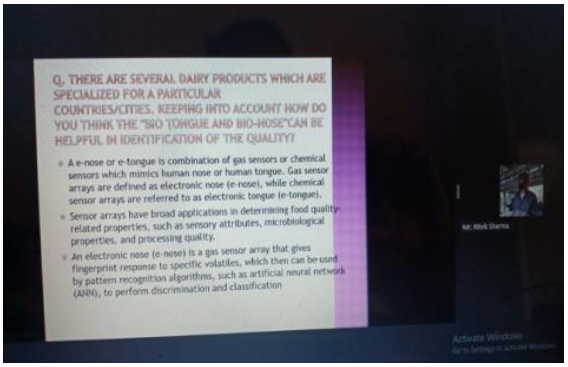


Ms. Sristi Banerjee

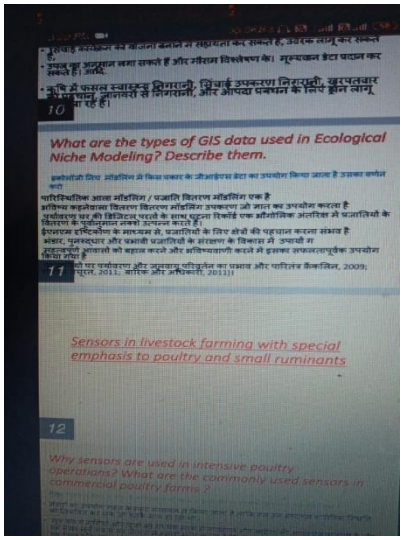


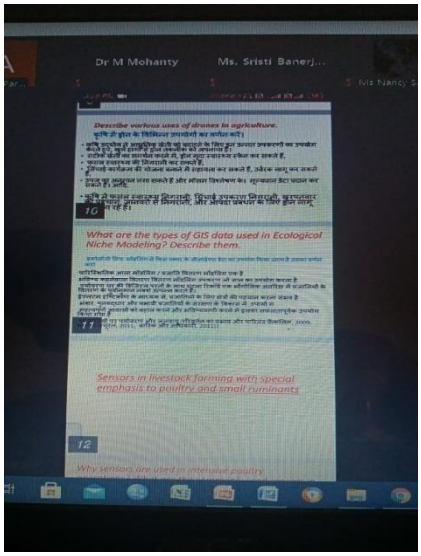
Ms. Vaishnavi Dubey



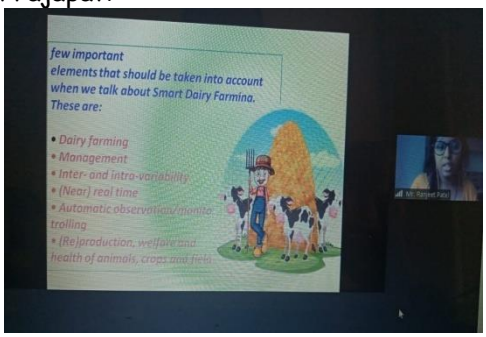


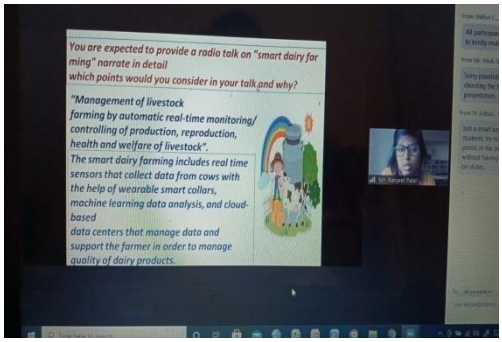
Two slides from presentation by Mr. Ritvik. Sharma



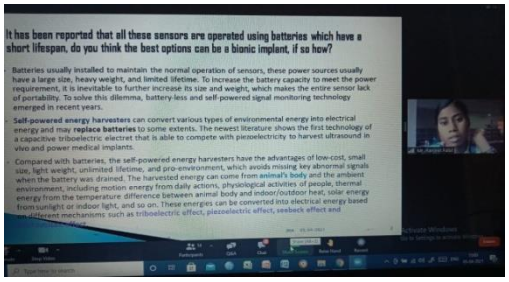


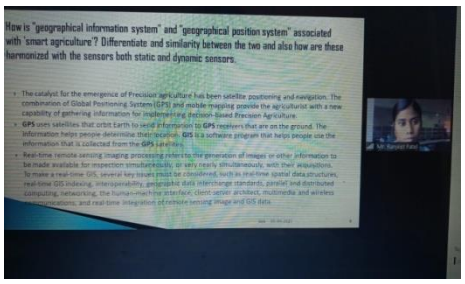
Two slides from presentation by Mr. Rahul Prajapati



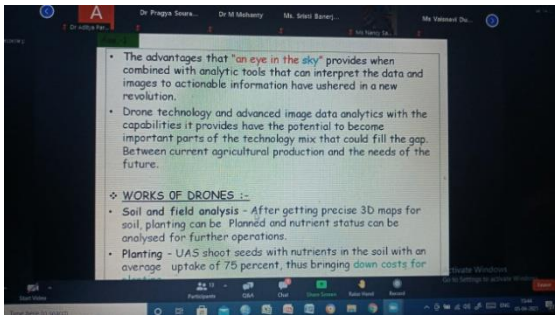


Two slides from presentation by Ms. Shruti Raj

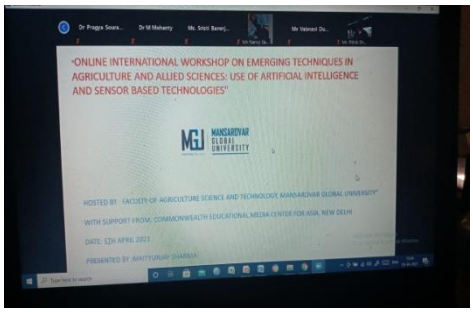




Two slides from presentation by Ms. Jaya Mandal



Mr. Ranjeet Patel



Mr. Mrityunjaya Sharma

Participants were able to satisfactorily present their assignments and express their ideas in response to queries raised by the panellists. One of the presenters was encouraged to discuss in Hindi. At the end of the presentations the panellists provided their viewpoints on the presentations and also appreciated the presenters' understanding on the subject. Dr. Dhyan Singh appreciated the presentations of the participants and wished them best of luck for their future endeavours.

Dr Aditya Parmar

Dr Monoranjan Mohanty

Training Modules

Workshop	
Day 1 22nd February 2021	Prof. Sandip Banerjee Sensors in livestock farming with focus on poultry and small ruminants
Day 2 23rd February 2021	Dr. Monoranjan Mohanty Sensor based technologies used in crop sciences
Day 3 24th February 2021	Dr. Pragya Saurabh Artificial intelligence and biomodelling
Day 4 25th February 2021	Dr. Aditya Parmar Sensors used in post-harvest technology
Day 5 26th February 2021	Dr. Mestawet Taye Sensor based technologies used in dairy farming and processing
Post workshop activity	
27th February 2021 to 4th April 2021	Participant engagement and assignments facilitated by experts
Interactive follow-up session	
5th April 2021	Follow-up interactive session between experts and participants

Feedback from the participants

A Google Form was shared with the participants to capture their perceptions of the workshop. The feedback received from the participants based on the Google Form indicated that the participants appreciated the contents of the workshop.

The findings further indicated that all the participants of the workshop appreciated the topics covered (Figure 1). The respondents rated the workshop to be quite useful, which can be associated with the topics which are futuristic. They were also of the opinion that the topics were well presented and discussed by the presenters.

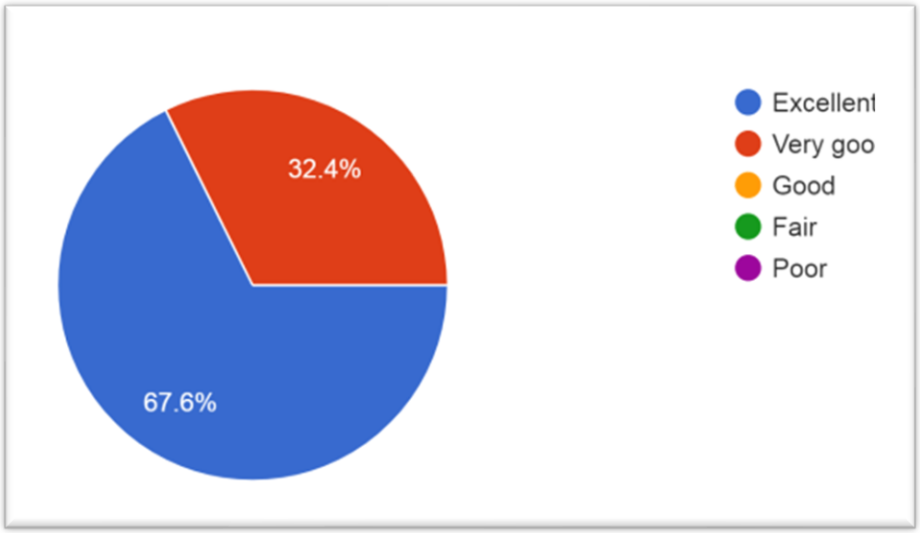


Figure 1: The response of the participants regarding the rating of the workshop

The participants also opined that the topics covered in the workshop were quite pertinent and would be helpful in their studies and research alike (Figure 2)

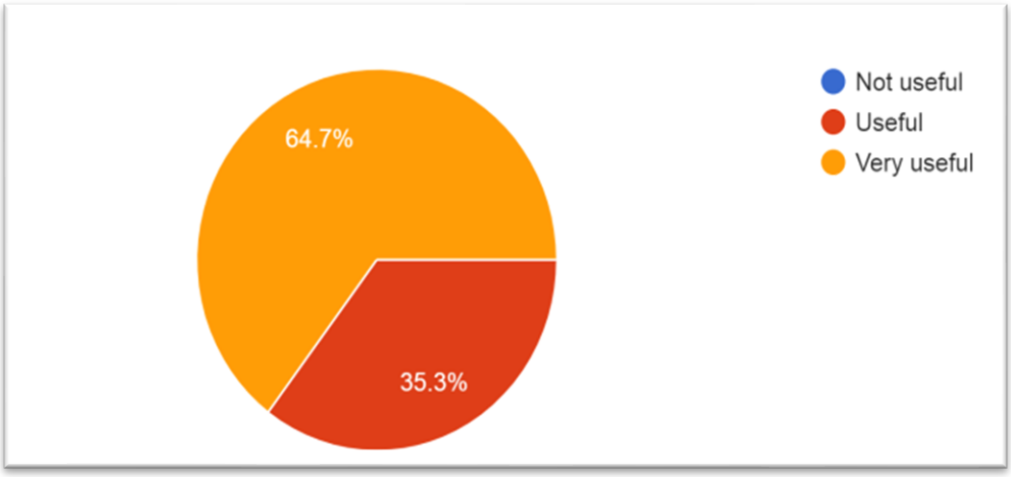


Figure 2: The usefulness of the topics covered in the workshop as indicated by the participants

Some of the responses of the participants regarding the usefulness of the workshop in their future studies are presented below.

Sl. No	**Responses of some of the participants**
1	*This is sensor-based technology information. It will help a lot*
2	*It has given me a new sense of direction regarding sensor-based technology and how it can be used in agriculture and allied fields as well as the future prospects.*
3	*Excellent, helps me the way I design even for my research*
4	*It teaches helpful topics*
5	*Techniques can be efficiently and effectively applied in Jute Improvement*
6	*It was on most relevant topics that are going to help us in future*
7	*Yes, it is useful for future studies because today all things are digital*
8	*Physical works with models can be very useful*
9	*For planning my Ph.D. topic*
10	*It will help in phenotypic studies of morphological characters of crop in field*
11	*Topics covered are very helpful for future*
12	*Recent advancement in plant sciences and agricultural sciences will help in understanding the natural ecosystem.*

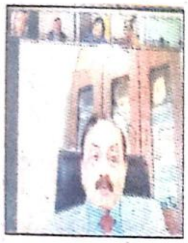
Coverage of the workshop in local newspapers

मानसरोवर ग्लोबल यूनिवर्सिटी में भरती तकनीकों पर अंतर्राष्ट्रीय कार्यशाला का समापन

भोपाल। मानसरोवर ग्लोबल यूनिवर्सिटी द्वारा कॉमनवेल्थ एजुकेशनल मीडिया सेंटर फॉर एशिया के साथ मिलकर अंतर्राष्ट्रीय कार्यशाला का समापन किया गया। पांच दिवसीय कार्यशाला 22 से 26 फरवरी के मध्य आयोजित की गई जिसमें कृषि विज्ञान के क्षेत्र में उभरती तकनीक के विषय में देश-विदेश से कई विषय विशेषज्ञों ने बढ़-चढ़ कर हिस्सा लिया। समापन अवसर पर मानसरोवर ग्लोबल यूनिवर्सिटी के प्रो-चांसलर गौरव तिवारी ने कहा कि कृषि क्षेत्र में नवीन तकनीक का इस्तेमाल कर फसलों को कम संसाधनों में अधिक उपज और व्याधिमुक्त प्रजातियों का प्रयोग कर किसानों को अधिक से अधिक लाभ पहुंचाया जा सकता है। इससे पहले कार्यशाला का शुभारंभ करते हुए मुख्य अतिथि कॉमनवेल्थ एजुकेशनल मीडिया सेंटर फॉर एशिया की डायरेक्टर प्रो. मधु परहार ने कहा कि कृषि के क्षेत्र में सेंसर तकनीक 21वीं सदी की तकनीक है जिसके विषय में विस्तार से जानना काफी लाभप्रद है। मानसरोवर ग्लोबल यूनिवर्सिटी के कुलपति प्रो. अरूण कुमार पाण्डेय ने कहा कि स्मार्ट कृषि किसानों को पानी, उर्वरक और बीज जैसे न्यूनतम संसाधनों से पैदावार बढ़ाने में सहायक है। 22 फरवरी को एग्रीकल्चर विभाग के डीन डॉ. संदीप बैनर्जी ने मुर्गी एवं जुगाली करने वाले पशुधन की खेती में सेंसर की उपयोगिता विषय पर विस्तार से चर्चा की। 23 फरवरी को इंडियन इंस्टीट्यूट ऑफ सॉइल साइंसेज के प्रिंसिपल साईंटिस्ट डॉ. मनोरंजन मोहंती ने श्फसल विज्ञान में सेंसर आधारित तकनीकों की उपयोगिताश विषय पर व्याख्यान दिया। 24 फरवरी को वनस्पति विभाग के असोसिएट प्रोफेसर डॉ. प्रज्ञा सौरभ ने बायोमॉडलिंग और आर्टिफीषियल इंटेलिजेंस विषय पर व्याख्यान दिया। व्याख्यान श्रृंखला के चैथे दिन युनाइटेड किंगडम के साईंटिस्ट डॉ. आदित्य परमार ने फसल कटाई के बाद की तकनीक में सेंसर का इस्तेमाल विषय पर चर्चा की।

स्टार समाचार Sat, 27 Febr epaper.stars

मानसरोवर यूनिवर्सिटी में कृषि विज्ञान पर कार्यशाला



भोपाल। मानसरोवर ग्लोबल यूनिवर्सिटी द्वारा कॉमनवेल्थ एजुकेशनल मीडिया सेंटर फॉर एशिया के साथ मिलकर अंतरराष्ट्रीय कार्यशाला का समापन किया गया। पांच दिवसीय कार्यशाला 22 से 26 फरवरी के मध्य आयोजित की गई जिसमें कृषि विज्ञान के क्षेत्र में उभरती तकनीक के विषय में देश-विदेश से कई विषय विशेषज्ञों ने बढ़-चढ़ कर हिस्सा लिया। समापन अवसर पर मानसरोवर ग्लोबल यूनिवर्सिटी के प्रो-चांसलर गौरव तिवारी ने कहा कि कृषि क्षेत्र में नवीन तकनीक का इस्तेमाल कर फसलों को कम संसाधनों में अधिक उपज और व्याधिमुक्त प्रजातियों का प्रयोग कर किसानों को अधिक से अधिक लाभ पहुंचाया जा सकता है। इससे पहले कार्यशाला का शुभारंभ करते हुए मुख्य अतिथि कॉमनवेल्थ एजुकेशनल मीडिया सेंटर फॉर एशिया की डायरेक्टर प्रो. मधु परहार ने कहा कि कृषि के क्षेत्र में सेंसर तकनीक 21वीं सदी की तकनीक है जिसके विषय में विस्तार से जानना काफी लाभप्रद है। वहीं मानसरोवर ग्लोबल यूनिवर्सिटी के कुलपति प्रो. अरूण कुमार पाण्डेय ने कहा कि स्मार्ट कृषि किसानों को पानी, उर्वरक और बीज जैसे न्यूनतम संसाधनों से पैदावार बढ़ाने में सहायक है। वहीं कार्यशाला के समापन दिवस पर इथोपिया की हवासा यूनिवर्सिटी की प्रोफेसर डॉ. मेसतावेत ताये ने डेयरी फार्मिंग और प्रोसेसिंग में सेंसर आधारित प्रौद्योगिकियां विषय पर व्याख्यान दिया।

मानसरोवर ग्लोबल यूनिवर्सिटी में कृषि विज्ञान के क्षेत्र में उभरती तकनीकों पर अंतर्राष्ट्रीय कार्यशाला का समापन

भोपाल। मानसरोवर ग्लोबल यूनिवर्सिटी द्वारा कॉमनवेल्थ एजुकेषनल मीडिया सेंटर फॉर एषिया के साथ मिलकर अंतर्राष्ट्रीय कार्यषाला का समापन किया गया। पांच दिवसीय कार्यषाला 22 से 26 फरवरी के मध्य आयोजित की गई जिसमें श्कृषि विज्ञान के क्षेत्र में उभरती तकनीकश् के

विषय में देष-विदेष से कई विषय विषेषज्ञों ने बढ़-चढ़ कर हिस्सा लिया। समापन अवसर पर मानसरोवर ग्लोबल यूनिवर्सिटी के प्रो-चांसलर गौरव तिवारी ने कहा कि कृषि क्षेत्र में नवीन तकनीक का इस्तेमाल कर फसलों को कम संसाधनों में अधिक उपज और व्याधिमुक्त प्रजातियों का प्रयोग कर किसानों को अधिक से अधिक लाभ पहुंचाया जा सकता है। इससे पहले कार्यषाला का शुभारंभ करते हुए मुख्य अतिथि कॉमनवेल्थ एजुकेषनल मीडिया सेंटर फॉर एषिया की डायरेक्टर प्रो. मधु परहार ने कहा कि कृषि के क्षेत्र में सेंसर तकनीक 21वीं सदी की तकनीक है जिसके विषय में विस्तार से जानना काफी लाभप्रद है। वहीं मानसरोवर ग्लोबल यूनिवर्सिटी के कुलपति प्रो. अरूण कुमार पाण्डेय ने कहा कि स्मार्ट कृषि किसानों को पानी, उर्वरक और बीज जैसे न्यूनतम संसाधनों से पैदावार बढ़ाने में सहायक है। और आज कृषि उद्योग आर्टिफीषियल इंटेलिजेंस की तकनीकों की ओर रूख कर रहे हैं। प्रथम दिवस 22 फरवरी को एग्रीकल्चर विभाग के डीन डॉ. संदीप बैनर्जी ने श्मुर्गी एवं जुगाली करने वाले पशुधन की खेती में सेंसर की उपयोगिताश् विषय पर विस्तार से चर्चा की। द्वितीय दिवस 23 फरवरी को इंडियन इंस्टीट्यूट ऑफ सॉइल साइंसेज के प्रिंसिपल साइंटिस्ट डॉ. मनोरंजन मोहंती ने श्फसल विज्ञान में सेंसर आधारित तकनीकों की उपयोगिताश् विषय पर व्याख्यान दिया। 24 फरवरी को वनस्पति विभाग के असोसिएट प्रोफेसर डॉ. प्रज्ञा सौरभ ने बायोमॉडलिंग और आर्टिफीषियल इंटेलिजेंस विषय पर व्याख्यान दिया। व्याख्यान श्रृंखला के चौथे दिन युनाइटेड किंगडम के साइंटिस्ट डॉ. आदित्य परमार ने श्फसल कटाई के बाद की तकनीक में सेंसर का इस्तेमालश् विषय पर चर्चा की। वहीं कार्यषाला के समापन दिवस पर इथोपिया की हवासा यूनिवर्सिटी की प्रोफेसर श्डॉ. मेसतावेत ताये ने डेयरी फार्मिंग और प्रोसेसिंगश् में सेंसर आधारित प्रौद्योगिकियों विषय पर व्याख्यान दिया।

मानसरोवर ग्लोबल यूनिवर्सिटी में अंतर्राष्ट्रीय कार्यशाला का समापन

भोपाल। मानसरोवर ग्लोबल यूनिवर्सिटी द्वारा कॉमनवेल्थ एजुकेशनल मीडिया सेंटर फॉर एशिया के साथ मिलकर अंतर्राष्ट्रीय कार्यशाला का समापन किया गया। पांच दिवसीय कार्यशाला 22 से 26 फरवरी के मध्य आयोजित की गई जिसमें कृषि विज्ञान के क्षेत्र में उभरती तकनीक के विषय में देश-विदेश से कई विषय विशेषज्ञों ने बढ़-चढ़ कर हिस्सा लिया। समापन अवसर पर मानसरोवर ग्लोबल यूनिवर्सिटी के प्रो-चांसलर गौरव तिवारी ने कहा कि कृषि क्षेत्र में नवीन तकनीक का इस्तेमाल कर फसलों को कम संसाधनों में अधिक उपज और व्याधिमुक्त प्रजातियों का प्रयोग कर किसानों को अधिक से अधिक लाभ पहुंचाया जा सकता है। इससे पहले कार्यशाला का शुभारंभ करते हुए मुख्य अतिथि कॉमनवेल्थ एजुकेशनल मीडिया सेंटर फॉर एशिया की डायरेक्टर प्रो. मधु परहार ने कहा कि कृषि के क्षेत्र में सेंसर तकनीक 21वीं सदी की तकनीक है जिसके विषय में विस्तार से जानना काफी लाभप्रद है। मानसरोवर ग्लोबल यूनिवर्सिटी के कुलपति प्रो. अरूण कुमार पाण्डेय ने कहा कि स्मार्ट कृषि किसानों को पानी, उर्वरक और बीज जैसे न्यूनतम संसाधनों से पैदावार बढ़ाने में सहायक है। कार्यशाला के समापन दिवस पर इथोपिया की हवासा यूनिवर्सिटी की प्रोफेसर डॉ. मेसतावेत ताये ने डेयरी फार्मिंग और प्रोसेसिंग में सेंसर आधारित प्रौद्योगिकियां विषय पर व्याख्यान दिया।

Raj News

Appendix:

List of participants

Sl. No.	**Full name of participant**	**Designation**	**Department**	**Institution**	**Gender**
1	Abdul Raheem	Ph.D scholar	Food Technology	Mansarovar Global University, Bhopal	Male
2	Abhishek Dhaker	Student	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
3	Abhishek Kumar Patel	Student	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
4	Abhishek Tiwari	Student	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
5	Aishwarya Saratkar	Student	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Female
6	Akash Madhukar Lathad	Faculty	Krishi Vigyan Kendra, Nashik	Yashwantrao Chavan Maharashtra Open University, Nashik (India)	Male
7	Arshita Verma	Student: Undergraduate	Food Technology and Management	National Institute of Food Technology Entrepreneurship and Management	Female
8	Ayush Dhote	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
9	Babusing Damore	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
10	Bali Tesfaye Sora	Faculty	Animal Range Sciences	Bule Hora University	Male
11	Bitan Sarkar	Student: Undergraduate	BS-MS integrated course	Indian Association For The Cultivation Of Science	Male
12	Davendra Lodhi	Student	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
13	Devendra Namdev	Student	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
14	Divakar ughade	Student	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
15	Dr Shweta Shekhar	Faculty	Botany	DDU Gorakhapur University Gorakhapur	Female
16	Dr. Amar Nath Singh	Faculty	Botany	A.N. College, Dumka, Jharkhand	Male
17	Dr. Anand Singh Jeena	Faculty	Genetics and Plant Breeding	G B Pant University of Agriculture and Technology, Pantnagar-Uttarakhand, India	Male
18	Dr. Baddam Jyothi	Faculty	Zoology	Nizam college, Osmania college	Female

				Hyderabad	
19	Dr. Rakesh Kumar Yadav	Faculty	Chemistry	Dr. C.V. Raman University, Kargi Road Kota, Bilaspur C.G. India	Male
20	Dr. S. Rajagopal Reddy	Faculty	Department of Botany	Yogi Vemana University	Male
21	Dr. Satish Sharma	Faculty	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
22	Dr. Vipin Joshi	Manager	Quality assurance	AgroStar	Male
23	Dr.Ruchi Srivastava	Ex-Women Scientist (DST, New Delhi, India)	Department of Botany	Delhi University	Female
24	Durgesh Patidar	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
25	Govind Megwal	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
26	Govind Singh	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
27	Govinda Bihare	Faculty	Agriculture Extension	R.K.D.F University, Bhopal	Male
28	Haile Welearegay Gebreslase	Faculty	School of Animal and Range Sciences	Hawassa University	Male
29	Hemant Lodha	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
30	Dr. J K Meena	Faculty	Genetics and Plant Breeding	G.B. Pant University of Agriculture and Technology	Male
31	Jaya Mandal	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
32	K. Abdul Wahab Shah	Student	Faculty of Agriculture Science and Technology	R.N.Tagore University	Male
33	Kadambini	Faculty	Faculty of Botany	"RLSY COLLEGE (WEST CHAMPARAN), BRAB UNIVERSITY, MUZAFFARPUR, BIHAR	Female
34	Kamlakshi Vyas	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Female
35	Kefala Taye Mekonnen	Faculty	Animal Range Sciences	Arsi University	Male
36	Kumar Nishant Chourasia	Faculty	Department of Crop Improvement	Central Institute of Jute and Allied Fibers	Male
37	Manisha	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Female
38	Mohit Bharadwaj	Post graduate student	Plant Breeding	G.B. Pant University of Agriculture and Technology	Male
39	Mohit Pawar	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
40	Mohit Thakur	Student	Faculty of Agriculture	Mansarovar Global University,	Male

		Undergraduate	Science and Technology	Bhopal	
41	Mrityunjay Sharma	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
42	Murugharajendra Honnuri	Faculty	Forest Ecology & Climate change	Institute of Forest Biodiversity	Male
43	Nancy Saha	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Female
44	Nandni Nagwanshi	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Female
45	Narendra Lodha	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
46	Neha Kandwal	Post graduate student	Plant Breeding	G.B. Pant University of Agriculture and Technology	Female
47	Pratima Patel	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Female
48	Pushpendra Nayak	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
49	Rahul Prajapati	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
50	Ranjeet Patel	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
51	Ritvik Sharma	Student	Sardar Vallabh Bhai Patel University of Agriculture and Technology		Male
52	Riya Goswami	Student	Plant Breeding	G.B. Pant University of Agriculture and Technology	Female
53	Rohit Solanki	Student	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
54	Sachin Singh	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
55	Sajjan Thakur	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
56	Sandhya Damor	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Female
57	Sanjay Solanki	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
58	Sarfraz Ahmad	PhD student	Genetics and Plant Breeding	S. K. N. Agriculture University, Jobner, Rajasthan, India	Male
59	Shyam Thakur	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
60	Sattwik Ghatak	Student Undergraduate	Class 12th	Swaminarayan Gyan Kendra, Umbergaon, Gujarat,India	Male

61	Satvinder Singh	Post graduate student	Plant Breeding	G.B. Pant University of Agriculture and Technology	Male
62	Satyam Sahu	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
63	Shruti Raj	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Female
64	Sivendra Joshi	Post graduate student	Plant Breeding	G.B. Pant University of Agriculture and Technology	Male
65	Sk Asif Iqbal	Student	Integrated BS-MS	Indian Association for the Cultivation of Science	Male
66	Sristi Banerjee	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Female
67	Subodh Markam	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
68	Sudheer Sahu	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
69	Sujeet Kushwaha	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
70	Sumit Bahuguna	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
71	Tesfalem Aseged	Asst Researcher	Animal Range Sciences	Ethiopian Biodiversity Institute	Male
72	Trivendra Amrute	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
73	Vaishnavi Dubey	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Female
74	Vikas Belwal	Technical Assistant	Directorate of Wheat Development	Directorate of Wheat Development, Ministry of Agriculture	Male
75	Vikesh Kalara	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
76	Vikram Banna	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
77	Vishnu Dubey	Student	BE (Computer science and engineering)	Jawaharlal Nehru College of Technology Rewa (Madhya Pradesh)	Male
78	Yogesh Choukiker	Student Undergraduate	Faculty of Agriculture Science and Technology	Mansarovar Global University, Bhopal	Male
79	Zemedkun	Faculty	Animal and Range Sciences	Mekdela Amba University, Ethiopia	Male
80	Sachin Dongare	Student	Livestock Production and Management	G.B. Pant University of Agriculture and Technology	Male